

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

23 JUL 2004

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference  
(if desired) (12 characters maximum) 91.M1002WO36

Box No. I TITLE OF INVENTION

METHOD FOR STERILISING FOOD PRODUCTS, IN PARTICULAR PUREES AND/OR CONCENTRATES

Box No. II APPLICANT

This person is also inventor

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

SIG Manzini S.p.A.  
Via Paradigna, 94/A  
43100 PARMA ITALY

Telephone No.

Faxsimile No.

Teleprinter No.

Applicant's registration No. with the Office

State (that is, country) of nationality:  
IT

State (that is, country) of residence:  
IT

This person is applicant  all designated States  all designated States except the United States of America  the United States of America only  the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

ARELLI Pierluigi  
Stradello Pramori, 1  
43100 PARMA ITALY

This person is:

applicant only

applicant and inventor

inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:  
IT

State (that is, country) of residence:  
IT

This person is applicant  all designated States  all designated States except the United States of America  the United States of America only  the States indicated in the Supplemental Box

Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

agent

common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

GOTRA Stefano  
BUGNION S.p.A.  
Via Garibaldi, 22  
43100 PARMA ITALY

Telephone No.  
(0039-521) 232487

Faxsimile No.  
(0039-521) 289925

Teleprinter No.

Agent's registration No. with the Office  
503BM

Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

## Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

*If none of the following sub-boxes is used, this sheet should not be included in the request.*

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

LUSARDI Roberto  
Via Pelacani, 4  
43100 PARMA ITALY

This person is:

applicant only  
 applicant and inventor  
 inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

IT

State (that is, country) of residence:

IT

This person is applicant for the purposes of:  all designated States  all designated States except the United States of America  the United States of America only  the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

PACIELLO Gerardo  
Vico 3° Mazzini, 7  
85010 PIGNOLA (POTENZA)

This person is:

applicant only  
 applicant and inventor  
 inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

IT

State (that is, country) of residence:

IT

This person is applicant for the purposes of:  all designated States  all designated States except the United States of America  the United States of America only  the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

applicant only  
 applicant and inventor  
 inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:  all designated States  all designated States except the United States of America  the United States of America only  the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

applicant only  
 applicant and inventor  
 inventor only (If this check-box is marked, do not fill in below.)

Applicant's registration No. with the Office

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:  all designated States  all designated States except the United States of America  the United States of America only  the States indicated in the Supplemental Box

Further applicants and/or (further) inventors are indicated on another continuation sheet.

**Box No. V DESIGNATION**

## STATES

Mark the applicable check-boxes below: at least one must be marked.

The following designations are hereby made under Rule 4.9(a):

## Regional Patent

- AP ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, MZ Mozambique, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZM Zambia, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT (*if other kind of protection or treatment desired, specify on dotted line*) . . . . .
- EA Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- EP European Patent: AT Austria, BE Belgium, BG Bulgaria, CH & LI Switzerland and Liechtenstein, CY Cyprus, CZ Czech Republic, DE Germany, DK Denmark, EE Estonia, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, SK Slovakia, TR Turkey, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- OA OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GQ Equatorial Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (*if other kind of protection or treatment desired, specify on dotted line*) . . . . .

National Patent (if other kind of protection or treatment desired, specify on dotted line):

<input checked="" type="checkbox"/> AE United Arab Emirates .....	<input checked="" type="checkbox"/> GM Gambia .....	<input checked="" type="checkbox"/> NZ New Zealand .....
<input checked="" type="checkbox"/> AG Antigua and Barbuda .....	<input checked="" type="checkbox"/> HR Croatia .....	<input checked="" type="checkbox"/> OM Oman - .....
<input checked="" type="checkbox"/> AL Albania .....	<input checked="" type="checkbox"/> HU Hungary .....	<input checked="" type="checkbox"/> PH Philippines - .....
<input checked="" type="checkbox"/> AM Armenia .....	<input checked="" type="checkbox"/> ID Indonesia .....	<input checked="" type="checkbox"/> PL Poland .....
<input checked="" type="checkbox"/> AT Austria .....	<input checked="" type="checkbox"/> IL Israel .....	<input checked="" type="checkbox"/> PT Portugal .....
<input checked="" type="checkbox"/> AU Australia .....	<input checked="" type="checkbox"/> IN India .....	<input checked="" type="checkbox"/> RO Romania .....
<input checked="" type="checkbox"/> AZ Azerbaijan .....	<input checked="" type="checkbox"/> IS Iceland .....	<input checked="" type="checkbox"/> RU Russian Federation .....
<input checked="" type="checkbox"/> BA Bosnia and Herzegovina .....	<input checked="" type="checkbox"/> JP Japan .....	
<input checked="" type="checkbox"/> BB Barbados .....	<input checked="" type="checkbox"/> KE Kenya .....	<input checked="" type="checkbox"/> SD Sudan .....
<input checked="" type="checkbox"/> BC Bulgaria .....	<input checked="" type="checkbox"/> KG Kyrgyzstan .....	<input checked="" type="checkbox"/> SE Sweden .....
<input checked="" type="checkbox"/> BR Brazil .....	<input checked="" type="checkbox"/> KP Democratic People's Republic of Korea .....	<input checked="" type="checkbox"/> SG Singapore .....
<input checked="" type="checkbox"/> BY Belarus .....	<input checked="" type="checkbox"/> KR Republic of Korea .....	<input checked="" type="checkbox"/> SI Slovenia .....
<input checked="" type="checkbox"/> BZ Belize .....	<input checked="" type="checkbox"/> KZ Kazakhstan .....	<input checked="" type="checkbox"/> SK Slovakia .....
<input checked="" type="checkbox"/> CA Canada .....	<input checked="" type="checkbox"/> LC Saint Lucia .....	<input checked="" type="checkbox"/> SL Sierra Leone .....
<input checked="" type="checkbox"/> CH & LI Switzerland and Liechtenstein .....	<input checked="" type="checkbox"/> LK Sri Lanka .....	<input checked="" type="checkbox"/> TJ Tajikistan .....
<input checked="" type="checkbox"/> CN China .....	<input checked="" type="checkbox"/> LR Liberia .....	<input checked="" type="checkbox"/> TM Turkmenistan .....
<input checked="" type="checkbox"/> CO Colombia .....	<input checked="" type="checkbox"/> LS Lesotho .....	<input checked="" type="checkbox"/> TN Tunisia - .....
<input checked="" type="checkbox"/> CR Costa Rica .....	<input checked="" type="checkbox"/> LT Lithuania .....	<input checked="" type="checkbox"/> TR Turkey .....
<input checked="" type="checkbox"/> CU Cuba .....	<input checked="" type="checkbox"/> LU Luxembourg .....	<input checked="" type="checkbox"/> TT Trinidad and Tobago .....
<input checked="" type="checkbox"/> CZ Czech Republic .....	<input checked="" type="checkbox"/> LV Latvia .....	<input checked="" type="checkbox"/> TZ United Republic of Tanzania .....
<input checked="" type="checkbox"/> DE Germany .....	<input checked="" type="checkbox"/> MA Morocco .....	<input checked="" type="checkbox"/> UA Ukraine .....
<input checked="" type="checkbox"/> DK Denmark .....	<input checked="" type="checkbox"/> MD Republic of Moldova .....	<input checked="" type="checkbox"/> UG Uganda .....
<input checked="" type="checkbox"/> DM Dominica .....		<input checked="" type="checkbox"/> US United States of America .....
<input checked="" type="checkbox"/> DZ Algeria .....	<input checked="" type="checkbox"/> MG Madagascar .....	
<input checked="" type="checkbox"/> EC Ecuador .....	<input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia .....	<input checked="" type="checkbox"/> UZ Uzbekistan .....
<input checked="" type="checkbox"/> EE Estonia .....	<input checked="" type="checkbox"/> MN Mongolia .....	<input checked="" type="checkbox"/> VN Viet Nam .....
<input checked="" type="checkbox"/> ES Spain .....	<input checked="" type="checkbox"/> MW Malawi .....	<input checked="" type="checkbox"/> YU Yugoslavia .....
<input checked="" type="checkbox"/> FI Finland .....	<input checked="" type="checkbox"/> MX Mexico .....	<input checked="" type="checkbox"/> ZA South Africa .....
<input checked="" type="checkbox"/> GB United Kingdom .....	<input checked="" type="checkbox"/> MZ Mozambique .....	<input checked="" type="checkbox"/> ZM Zambia - .....
<input checked="" type="checkbox"/> GD Grenada .....	<input checked="" type="checkbox"/> NO Norway .....	<input checked="" type="checkbox"/> ZW Zimbabwe .....

Check-boxes below reserved for designating States which have become party to the PCT after issuance of this sheet:

□ ..... □ ..... □ .....

**Precautionary Designation Statement:** In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

**Box No. VI PRIORITY CLAIM**

The priority of the following earlier application(s) is hereby claimed:

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country or Member of WTO	regional application: regional Office	international application: receiving Office
item (1) 24/01/2002	PR2002A000001	IT		
item (2)				
item (3)				
item (4)				
item (5)				

 Further priority claims are indicated in the Supplemental Box.

The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of this international application is the receiving Office) identified above as:

all items  item (1)  item (2)  item (3)  item (4)  item (5)  other, see  
Supplemental Box

\* Where the earlier application is an ARIPO application, indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed (Rule 4.10(b)(ii)): .....

**Box No. VII INTERNATIONAL SEARCHING AUTHORITY**

Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

ISA / EP .....

Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):

Date (day/month/year) Number Country (or regional Office)

**Box No. VIII DECLARATIONS**

The following declarations are contained in Boxes Nos. VIII (i) to (v) (mark the applicable check-boxes below and indicate in the right column the number of each type of declaration):

Number of declarations

<input type="checkbox"/> Box No. VIII (i)	Declaration as to the identity of the inventor	:
<input checked="" type="checkbox"/> Box No. VIII (ii)	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent	1
<input checked="" type="checkbox"/> Box No. VIII (iii)	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application	1
<input checked="" type="checkbox"/> Box No. VIII (iv)	Declaration of inventorship (only for the purposes of the designation of the United States of America)	1
<input type="checkbox"/> Box No. VIII (v)	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty	:

**Box No. VIII (ii) DECLARATION: ENTITLEMENT TO APPLY FOR AND BE GRANTED A PATENT**

*The declaration must conform to the standardized wording provided for in Section 212; see Notes to Boxes Nos. VIII, VIII (i) to (v) (in general) and the specific Notes to Box No. VIII (ii). If this Box is not used, this sheet should not be included in the request.*

Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent (Rules 4.17(ii) and 51bis.1(a)(ii)), in a case where the declaration under Rule 4.17(iv) is not appropriate:

in relation to this international application,

SIG Manzini S.p.A. is entitled to apply for and be granted a patent by virtue of the following:

SIG Manzini S.p.A. is entitled as employer of the inventors, ARELLI Pierluigi, LUSARDI Roberto, PACIELLO Gerardo.

This declaration is made for the purposes of all designations, except the designation of the United States of America.

This declaration is continued on the following sheet, "Continuation of Box No. VIII (ii)".

**Box No. VIII (iii) DECLARATION: ENTITLEMENT TO CLAIM PRIORITY**

*The declaration must conform to the standardized wording provided for in Section 213; see Notes to Boxes Nos. VIII, VIII (i) to (v) (in general) and the specific Notes to Box No. VIII (iii). If this Box is not used, this sheet should not be included in the request.*

Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application specified below, where the applicant is not the applicant who filed the earlier application or where the applicant's name has changed since the filing of the earlier application (Rules 4.17(iii) and 51bis.1(a)(iii)):

in relation to this international application

ARELLI Pierluigi, LUSARDI Roberto and PACIELLO Gerardo are entitled to claim priority of earlier application

No. PR2002A000001, IT, 24th January 2002

by virtue of the following:

the applicants are the inventors of the subject matter for which protection was sought by way of the earlier application.

This declaration is made for the purposes of the following designations for national and/or regional patents: US.

This declaration is continued on the following sheet, "Continuation of Box No. VIII (iii)".

## Box No. VIII (iv) DECLARATION: INVENTORSHIP (only for the purposes of the designation of the United States of America)

The declaration must conform to the following standardized wording provided for in Section 214; see Notes to Boxes Nos. VIII (i) to (v) (in general) and the specific Notes to Box No. VIII (iv). If this Box is not used, this sheet should not be included in the request.

**Declaration of Inventorship (Rules 4.17(iv) and 51bis.1(a)(iv))  
for the purposes of the designation of the United States of America:**

I hereby declare that I believe I am the original, first and sole (if only one inventor is listed below) or joint (if more than one inventor is listed below) inventor of the subject matter which is claimed and for which a patent is sought.

This declaration is directed to the international application of which it forms a part (if filing declaration with application).

This declaration is directed to international application No. PCT/..... (if furnishing declaration pursuant to Rule 26ter).

I hereby declare that my residence, mailing address, and citizenship are as stated next to my name.

I hereby state that I have reviewed and understand the contents of the above-identified international application, including the claims of said application. I have identified in the request of said application, in compliance with PCT Rule 4.10, any claim to foreign priority, and I have identified below, under the heading "Prior Applications," by application number, country or Member of the World Trade Organization, day, month and year of filing, any application for a patent or inventor's certificate filed in a country other than the United States of America, including any PCT international application designating at least one country other than the United States of America, having a filing date before that of the application on which foreign priority is claimed.

Prior Applications: PR2002A000001, IT, 24 January 2002 .....

.....

I hereby acknowledge the duty to disclose information that is known by me to be material to patentability as defined by 37 C.F.R. § 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the PCT international filing date of the continuation-in-part application.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name: ARELLI Pierluigi .....

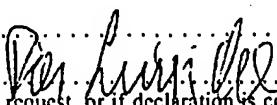
Residence: Parma, Italy .....

(city and either US state, if applicable, or country)

Mailing Address: Stradello Pramori, 1 .....

I-43100 Parma .....

Citizenship: Italy .....

Inventor's Signature:  (if not contained in the request, or if declaration is corrected or added under Rule 26ter after the filing of the international application. The signature must be that of the inventor, not that of the agent)

Date: 25th October 2002 .....

(of signature which is not contained in the request, or of the declaration that is corrected or added under Rule 26ter after the filing of the international application)

Name: LUSARDI Roberto .....

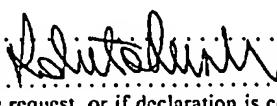
Residence: Parma, Italy .....

(city and either US state, if applicable, or country)

Mailing Address: Via Pelacani, 4 .....

I-43100 Parma .....

Citizenship: Italy .....

Inventor's Signature:  (if not contained in the request, or if declaration is corrected or added under Rule 26ter after the filing of the international application. The signature must be that of the inventor, not that of the agent)

Date: 25th October 2002 .....

(of signature which is not contained in the request, or of the declaration that is corrected or added under Rule 26ter after the filing of the international application)

This declaration is continued on the following sheet, "Continuation of Box No. VIII (iv)".

Continuation of Box No. VIII (i) to (v) **DECLARATION**

If the space is insufficient in any of Boxes Nos. VIII (i) to (v) to furnish all the information, including in the case where more than two inventors are to be named in Box No. VIII (iv), in such case, write "Continuation of Box No. VIII . . ." (indicate the item number of the Box) and furnish the information in the same manner as required for the purposes of the Box in which the space was insufficient. If additional space is needed in respect of two or more declarations, a separate continuation box must be used for each such declaration. If this Box is not used, this sheet should not be included in the request.

## Continuation of Box No. VIII (iv)

Name: PACIELLO Gerardo

Residence: Pignola (Potenza), Italy

Mailing Address: Vico 3° Mazzini, 7  
I-85010 Pignola

Citizenship: Italy

Inventor's Signature: 

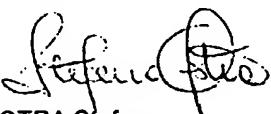
Date: 25th October 2002

## Box No. IX CHECK LIST - LANGUAGE OF FILING

This international application contains:		This international application is accompanied by the following item(s) (mark the applicable check-boxes below and indicate in right column the number of each item):		Number of items
(a) the following number of sheets in paper form: request (including declaration sheets) : 9 description (excluding sequence listing part) : 6 claims : 1 abstract : 1 drawings : 3  Sub-total number of sheets : 20		1. <input checked="" type="checkbox"/> fee calculation sheet : 1 2. <input checked="" type="checkbox"/> original separate power of attorney : 1 3. <input type="checkbox"/> original general power of attorney : 4. <input type="checkbox"/> copy of general power of attorney; reference number, if any: ..... : 5. <input type="checkbox"/> statement explaining lack of signature : 6. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s): ..... : 7. <input type="checkbox"/> translation of international application into (language): ..... : 8. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material : 9. <input type="checkbox"/> sequence listing in computer readable form (indicate also type and number of carriers (diskette, CD-ROM, CD-R or other)) (i) <input type="checkbox"/> copy submitted for the purposes of international search under Rule 13ter only (and not as part of the international application) : (ii) <input type="checkbox"/> (only where check-box (b)(i) or (b)(ii) is marked in left column) additional copies including, where applicable, the copy for the purposes of international search under Rule 13ter : (iii) <input type="checkbox"/> together with relevant statement as to the identity of the copy or copies with the sequence listing part mentioned in left column :  10. <input type="checkbox"/> other (specify): ..... : 		
(b) sequence listing part of description filed in computer readable form (i) <input type="checkbox"/> only (under Section 801(a)(i)) (ii) <input type="checkbox"/> in addition to being filed in paper form (under Section 801(a)(ii))  Type and number of carriers (diskette, CD-ROM, CD-R or other) on which the sequence listing part is contained (additional copies to be indicated under item 9(ii), in right column): ..... : 				
Figure of the drawings which should accompany the abstract:	1	Language of filing of the international application: English		

## Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).


GOTRA Stefano  
(Applicant's Agent)

For receiving Office use only		
1. Date of actual receipt of the purported international application:  3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:  4. Date of timely receipt of the required corrections under PCT Article 11(2):  5. International Searching Authority (if two or more are competent): ISA /		2. Drawings: <input type="checkbox"/> received:  <input type="checkbox"/> not received:
6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid		

For International Bureau use only

Date of receipt of the record copy by the International Bureau:
---



**FEES CALCULATION SHEET**  
**Annex to the Request**

For receiving Office use only

International Application No.

Applicant's or agent's  
file reference

91.M1002WO36

Date stamp of the receiving Office

Applicant

SIG Manzini S.p.A.

**CALCULATION OF PRESCRIBED FEES**

1. TRANSMITTAL FEE . . . . . EUR 30,99 **T**  
2. SEARCH FEE . . . . . EUR 945,00 **S**

International search to be carried out by **EPO**

(If two or more International Searching Authorities are competent to carry out the International search, indicate the name of the Authority which is chosen to carry out the International search.)

3. INTERNATIONAL FEE

Basic Fee

Where item (b) of Box No. IX applies, enter Sub-total number of sheets } **20**  
Where item (b) of Box No. IX does not apply, enter Total number of sheets }

**b1** first 30 sheets . . . . . EUR 444,00 **b1**

**b2** number of sheets  
in excess of 30 x fee per sheet = **b2**

**b3** additional component (only if sequence listing part of description  
is filed in computer readable form under Section 801(a)(i), or  
both in that form and on paper, under Section 801(a)(ii)):

400 x fee per sheet = **b3**

Add amounts entered at b1, b2 and b3 and enter total at B . . . . EUR 444,00 **B**

Designation Fees

The international application contains **93** designations.

**5** x **96,00** = **EUR 480,00 **D****  
number of designation fees payable (maximum 5) amount of designation fee

Add amounts entered at B and D and enter total at I . . . . EUR 924,00 **I**

(Applicants from certain States are entitled to a reduction of 75% of the  
International fee. Where the applicant is (or all applicants are) so entitled, the total  
to be entered at I is 25% of the sum of the amounts entered at B and D.)

4. FEE FOR PRIORITY DOCUMENT (if applicable) . . . . . **P**

5. TOTAL FEES PAYABLE . . . . . EUR 1899,99

Add amounts entered at T, S, I and P, and enter total in the TOTAL box

**TOTAL**

The designation fees are not paid at this time.

**MODE OF PAYMENT**

authorization to charge  
deposit account (see below)

postal money order

cash

coupons

cheque

bank draft

revenue stamps

other (specify): bank/giro

**AUTHORIZATION TO CHARGE (OR CREDIT) DEPOSIT ACCOUNT**

(This mode of payment may not be available at all receiving Offices)

Authorization to charge the total fees indicated above.

(This check-box may be marked only if the conditions for deposit accounts  
of the receiving Office so permit) Authorization to charge any deficiency  
or credit any overpayment in the total fees indicated above.

Authorization to charge the fee for priority document.

Receiving Office: RO/ \_\_\_\_\_

Deposit Account No.: \_\_\_\_\_

Date: \_\_\_\_\_

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

# PCT

## POWER OF ATTORNEY

(for an international application filed under the Patent Cooperation Treaty)

(PCT Rule 90.4)

The undersigned applicant(s) (Names should be indicated as they appear in the request):

SIG Manzini S.p.A., via Paradigna, 94/A - PARMA ITALY

ARELLI Pierluigi, Stradello Pramori, 1 - PARMA ITALY

LUSARDI Roberto, Via Pelacani, 4 - PARMA ITALY

PACIELLO Gerardo, Via 3° Mazzini, 7 - PIGNOLA (POTENZA) ITALY

hereby appoints (appoint) the following person as:  agent  common representative

Name and address

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to represent the undersigned before

all the competent International Authorities  
 the International Searching Authority only  
 the International Preliminary Examining Authority only

in connection with the international application identified below:

Title of the invention: Method for sterilising food products, in particular purees and/or concentrates

Applicant's or agent's file reference: 91.M1002WO36

International application number (if already available):

filed with the following Office ITALIAN PATENT AND TRADEMARK OFFICE as receiving Office  
and to make or receive payments on behalf of the undersigned.

Signature of the applicant(s) (where there are several applicants, each of them must sign; next to each signature, indicate the name of the person signing and the capacity in which the person signs, if such capacity is not obvious from reading the request or this power):

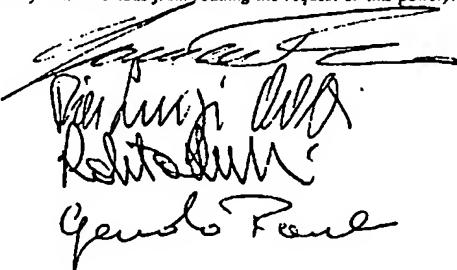
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Mr. LUSARDI Roberto

Mr. PACIELLO Gerardo

Date: 25th October 2002



# METHOD FOR STERILISING FOOD PRODUCTS, IN PARTICULAR PUREES AND/OR CONCENTRATES

## TECHNICAL FIELD AND BACKGROUND ART.

5 The present invention relates to a method for sterilising food products, in particular purees and/or concentrates, of the type comprising a step of heating the product by injecting steam at predetermined steam and a step of mixing the product, to allow a uniform distribution of the steam and consequently a heating that is as homogeneous as possible.

10 Currently, such a type of method is particularly adopted in the food sector of the manufacture of juices and/or concentrates of fruit and/or vegetables, such as tomatoes.

A first known method provides for the heating to take place by means of a pair of coaxial conduits. In particular, the smaller-diameter conduit, within 15 which flows the product to be heated, is externally lapped by a heating fluid that flows in the larger-diameter conduit.

A heating operated according to said procedures has the drawback of heating effectively only the mass of product that is in direct contact with the walls of the inner conduit that are lapped by the heating fluid. Therefore, the mass of 20 product that is substantially in correspondence with the centreline of the inner conduit undergoes an insufficient heating to assure the sterility of the product. In accordance with a second known method, the product is heated by injecting hot steam into it. While this method does allow for better heating than the first method, it nonetheless has the drawback of not assuring 25 temperature stability within the product.

In particular, areas of products with insufficient temperature may be created, thereby compromising the asepsis of the final product. It is not possible to obtain a uniform distribution of the steam inside the product due to the different physical state of the steam and of the product itself, normally 5 respectively gaseous and liquid.

To overcome this drawback, the product is heated to a higher temperature than the one actually required to guarantee sterilisation, so that, even in the presence of temperature variations, the temperature of the product never drops below a minimum value that guarantees its asepsis. However, 10 overheating entails the additional problem of deteriorating the quality of the product, changing its chemical-physical characteristics, such as taste, viscosity and/or consistency.

According to a third known method, the product is made to advance inside a conduit having, on its outer lateral walls, a plurality of recesses whereto 15 correspond an equal number of projections on the inner lateral walls, which thus are undulated. During its advance inside the conduit, the product is heated by injection of hot steam and, by effect of the turbulence generated by the undulation of the inner walls of the conduit, the product undergoes a mixing that should favour a uniform distribution of the steam and 20 consequently a homogeneous heating.

The method described above has the important drawback of being sensitive to the mass flow rate of the product. In particular, a different mass flow rate from the one for which the conduit was dimensioned influences the turbulence generated by the inner walls of the conduit and therefore does not 25 allow a uniform distribution of the steam, favouring temperature variations.

An additional drawback, therefore, is represented by the impossibility of throttling the plant, without compromising the asepsis of the product at the end of the treatment.

#### DISCLOSURE OF INVENTION.

5 An aim of the present invention is to eliminate the aforesaid drawbacks making available a method for sterilising food products, in particular purees and/or concentrates, which allows uniformly to heat the product to be treated, without any deterioration of its quality.

An additional aim of the present invention is to propose a sterilising method  
10 that allows to throttle the plant, without compromising the asepsis of the final product.

Another aim of the present invention is make available a method that allows a chemical-physical homogenisation of the product, drastically reducing its degradation.

15 A further aim of the present invention is to propose a sterilisation method that is simple and economical to implement.

Said aims are fully achieved by the method for sterilising food products, in particular purees and/or concentrates, of the present invention, which is characterised by the content of the claims set out below and in particular in  
20 that the method provides for executing the mixing step by means of at least a dynamic mixer.

#### BRIEF DESCRIPTION OF DRAWINGS.

This and other characteristics shall become more readily apparent from the following description of a preferred embodiment of the method illustrated,  
25 purely by way of non limiting example, in the accompanying drawing tables,

in which:

- Figure 1 shows a portion of an embodiment of a plant for sterilising food product that implements a method according to the invention;
- Figure 2 shows a partially sectioned lateral view of a first constructive detail of the plant of Figure 1;
- Figure 3 shows a partially sectioned axonometric view of a second constructive detail of the plant of Figure 1.

#### **BEST MODE FOR CARRYING OUT THE INVENTION.**

The method of the invention is of the type comprising at least a step of heating the product by injecting steam at predetermined temperature; in particular, the steam must be sufficiently hot to guarantee the asepsis of the product at the end of the treatment.

The method comprises at least a step of mixing the product, in order to enable a uniform distribution of the steam and consequently an equal heating of the product itself.

Said mixing step originally takes place by means of at least a dynamic mixer. Figure 2 shows, purely by way of example, a possible embodiment of a dynamic mixer able to carry out the aforesaid mixing step in accordance with the method.

With reference to Figure 2, the dynamic mixer is globally indicated with the number 1 and comprises a tank 2 for collecting the product, typically food puree or concentrate, an agitator 3 inserted in the tank to mix the product to be sterilised and means 4 for actuating the agitator. In particular, said means preferably comprise an electric motor.

The method also comprises a step of mixing the product by means of at least

a static mixer.

Figure 3 shows, purely by way of example, a possible embodiment of a static mixer able to carry out the aforesaid mixing step in accordance with the method.

- 5 With reference to Figure 3, the static mixer is globally indicated with the number 5 and comprises a tubular body 6 inside which flows the product, typically food puree or concentrate, a plurality of fixed baffles 7, positioned inside the tubular body and so shaped as to operate continuous deviations of the product and separation of the threads, to allow its mixing by effect of the
- 10 turbulence that develops.

Figure 1 shows a possible embodiment of the method according to the invention.

- 15 The product flows inside a conduit 100, which has undulated inner walls in accordance with the prior art and is provided with a plurality of steam injectors 200.

Subsequently, the heated product flows inside one or more static mixers 105, which perform a first coarse mixing to uniform the temperature of the product.

- 20 Thereafter, the pre-mixed product reaches a dynamic mixer 101 which performs a fine mixing, uniforming the temperature of the product and assuring its sterilisation.

According to an embodiment variation, the heating and mixing steps can be simultaneous. In this case, the steam injection takes place by means of a plurality of nozzles preferably associated directly to the dynamic mixer, 25 thereby obtaining a single processing stage.

The method of the invention achieves important advantages.

First of all, such a method allows to heat the product in uniform fashion, assuring temperature stability and guaranteeing asepsis. In particular, the use of a dynamic mixer allows a chemical-physical homogenisation of the 5 product, drastically reducing its degradation and safeguarding the organoleptic characteristics such as taste and colour, or the physical characteristics, such as viscosity and consistency.

Secondly, a mixing step carried out by means of dynamic mixers allows to throttle the plant, without compromising a uniform temperature distribution 10 inside the product and thus guaranteeing the asepsis of the final product.

Advantageously, said method is simple and economical to implement and can be used to sterilise even products with high viscosity.

Another advantage is represented by the fact that, given the presence of dynamic mixers, the static mixers and the undulated conduits into which the 15 steam is injected can have reduced length, since the turbulence created by them in the product is not the sole source of mixing action. Thanks to conduits of reduced length, therefore, it is possible to reduce head losses inside the plant, achieving considerable energy savings and lower pressures of the injected steam. This is even more readily apparent if the heating step 20 is simultaneous with the mixing step and both take place inside a dynamic mixer, in accordance with the described embodiment variation.

## CLAIMS

1. Method for sterilising food products, in particular purees and/or concentrates, comprising the steps of:
  - heating the product by injection of steam at predetermined temperature;
  - 5 mixing the product to allow a substantially uniform distribution of the steam; characterised in that the mixing step takes place by means of at least a dynamic mixer.
2. Method as claimed in claim 1, characterised in that the dynamic mixer comprises:
  - 10 at least a tank for collecting the product;
  - at least an agitator associated with the tank and operatively active on the product to mix it;
  - means for actuating the agitator.
3. Method as claimed in claim 1, characterised in that it further comprises
  - 15 a step of mixing the product by means of at least a static mixer.
4. Method as claimed in claim 3, characterised in that the static mixer comprises:
  - at least a tubular body within which the product flows;
  - 20 a plurality of fixed baffles, positioned inside the tubular body and so shaped as to operate continuous deviations of the product, to allow its mixing.
5. Method as claimed in claim 1, characterised in that the heating and mixing steps are simultaneous.
6. Method as claimed in claim 5, characterised in that the steam injection takes place by means of a plurality of nozzles directly associated with the
  - 25 dynamic mixer.

## ABSTRACT

Method for sterilising food products, in particular purees and/or concentrates, of the type comprising at least a step of heating the product by injection of steam at predetermined temperature and at least a step of mixing the product to allow a substantially uniform distribution of the steam. Said mixing step originally takes place by means of at least a dynamic mixer. A possible dynamic mixer able to implement said mixing step comprises at least a tank for collecting the product, at least an agitator associated with the tank and operatively active on the product to mix it and means for actuating the agitator.

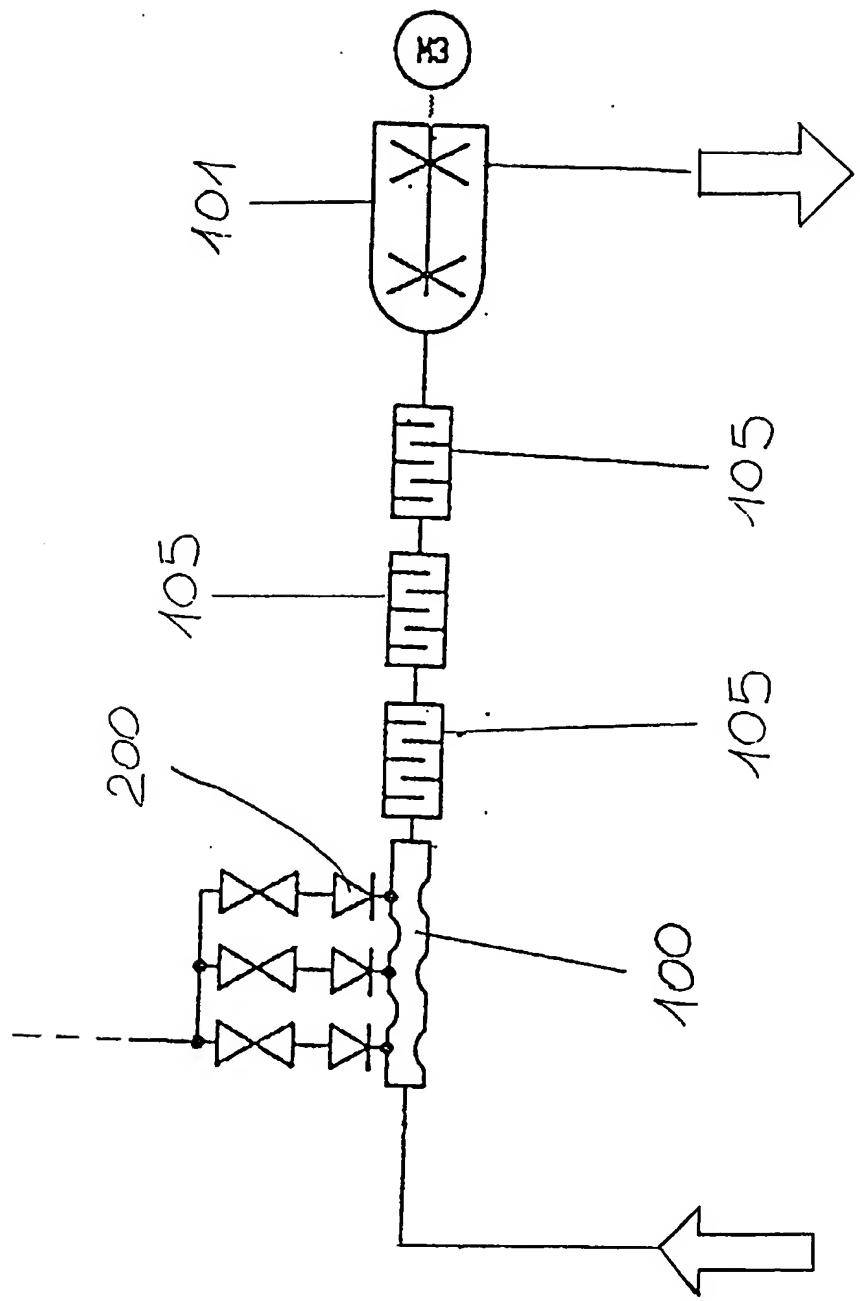


FIG.1

2 | 3

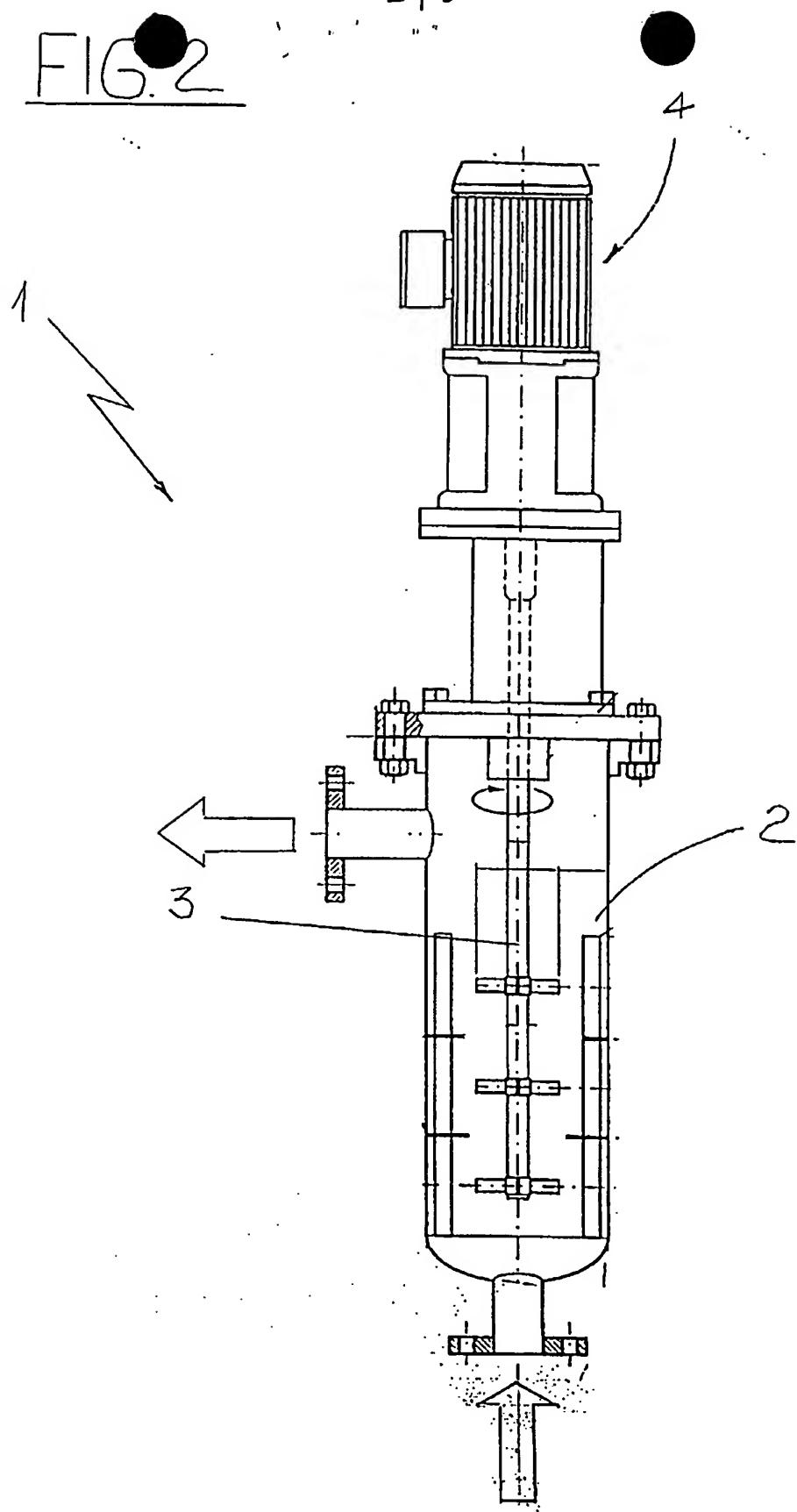
FIG.2

FIG. 3

